Math Research

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# Part 1: Inductive and Deductive Reasoning

Do an internet search on Carl Friedrich Gauss. Write a summary of who Gauss was and how some his accomplishments made math what it is today. Add a reference identifying the website you used.

## Answer

Carl Friedrich Gauss (1777-1855) is considered to be the greatest German mathematician of the nineteenth century. He contributed immensely to the fields of astronomy, geodesy, physics, number theory, and electromagnetism. His initial discoveries include the discovery that a 17-sided polygon could be drawn using a compass and a straight edge, and the fundamental theorem of Algebra which states that a polynomial will always have at least one root solution. He also helped develop methods by which the orbiting of asteroids could be determined with great precision (*Gauss*, n.d.). He devoted his life to mathematics and is thus considered, along with Newton and Archimedes, as one of the greatest mathematicians to have ever lived.

# Part 2: Investigating Number Patterns

Using your own words, explain how to complete the following successive differences problem: 2, 57, 220, 575, 1230, and 2317. Identify the next number in the sequence and describe how you calculated this value.

## Answer

The next number in the sequence is 3992. In the beginning, I assumed the unknown number to be ‘x’. Then I took differences between consecutive numbers in the sequence and noted them down. Then I tried to see if there was a pattern, I could not spot any. Then again, I calculated the difference between consecutive values in the emerging series. After repeating this process a couple of times, a series of differences developed amongst which the difference was 24 between consecutive values. From that, I found the value of ‘x’ which came out to be 3992.

# Part 3: Problem Solving Strategies

Write about how Polya's four-step process for problem solving can be used in everyday life. Provide specific examples of how you or somebody else might use this process.

## Answer

The four steps in Polya’s four step process include understanding the problem, devising a plan, carrying out the plan, and then interpreting the results. Let’s take the real-life example of a broken door handle. The first step will be to understand the problem i.e. if only the handle is broken or the wood of the door is also damaged. The second step will be to devise a plan for the replacement of the door handle i.e. you might plan to call the carpenter for this. The third step will be to call the carpenter and make him change the door handle. The last step will be to see if the handle works fine after the plan has been carried out.

# Part 1: Venn Diagram and Subsets

Do an internet search on John Venn. Write a summary of who Venn was and discuss how his invention of Venn diagrams and his work on logic affect mathematics. If you are looking for content/length, discuss real life examples where a Venn diagram could be used. Add a reference identifying the website you used.

## Answer

John Venn was an English logician, philosopher, and mathematician who is famously known for his work in the introduction of the Venn diagrams. A Venn diagram is often used in the representation of mathematical and logical concepts, particularly, relationships between variables in various fields of science. In the early part of his life, he had a passion for building machines due to which he invented the world’s first bowling machine. It was so accurate that when the Australians came to visit the place, one of their top batsmen got out four times consecutively. His main field of study, however was logic (*John Venn—Oxford Reference*, n.d.). He published three books on several topics related to logic and is considered as an authority in the field. He died in 1923.

# Part 2: Operations with Sets

Do an internet search on Augustus DeMorgan. Write a summary of who DeMorgan was and discuss what his contribution was to logic and mathematics. If you are looking for content/length, discuss examples of where we use DeMorgan’s logic today. Add a reference identifying the website you used.

## Answer

Augustus DeMorgan was a British Mathematician who is very well known for his work on mathematical induction. The process of mathematical induction was being used at that time repeatedly to solve problems but was not clearly defined. His greatest contribution, however, is in the field of mathematical logic where he introduced DeMorgan’s law. DeMorgan’s laws revolve around set theory and the inter-relationship between them (*Augustus De Morgan*, n.d.). They are, to this day, being used in several fields of science.

# Part 3: Cardinal number of infinite sets

Do an internet search on Georg Cantor. Include the website address in your journal entry. Summarize some of his contributions to set theory and mathematics and discuss where we might see his accomplishments in today’s world.

## Answer

Georg Cantor was a German Mathematician born in Russia, and is most commonly considered as the father of modern set theory. His discovery that the linear continuum is not countable meant that its points can not be counted using natural numbers. This meant that even though real numbers and natural numbers are both infinite, the number of real numbers will always remain greater than the number of natural numbers. This gave rise to the concepts of different sizes of infinity and set theories.

# Part 1: Logical Fallacies

Do an internet search on Logical Fallacies. Identify at least one logical fallacy that we didn’t study in this Unit. Define the fallacy (using letters and logic symbols) and give at least one example of this fallacy. Add a reference identifying the website you used.

## Answer

One fallacy that we did not study in the unit goes by the name of false cause. If two events that happen to occur at the same time are given a causal connection without any evidence, then such a fallacy is known as a causal fallacy or false cause fallacy. One classical example of this fallacy is the statement that my going to sleep causes the sun to set (*Fallacies (Stanford Encyclopedia of Philosophy)*, n.d.). It may be the case that both of these events have the same timeline but that does not necessitate a causal connection.

# Part 2: History of Logic

Do an internet search on Aristotle. Write a summary of who Aristotle was and some his accomplishments that lead people to believe that he is the father of modern logic. Add a reference identifying the website you used.

## Answer

Aristotle is counted in the list of the greatest philosophers who ever walked the Earth. His works in the field of logic form the basis of formal logic. His main works include his theory of syllogism which had an unparalleled influence on the history of Western thought. His works were inherited by the Arabic and the Latin medieval traditions and were thus made the norm of civilization(*Aristotle (Stanford Encyclopedia of Philosophy)*, n.d.). It was also said by philosophers that anyone after Aristotle who ever said anything new was either confused, perverse or stupid.

# Part 3: Logic in advertising

Do an internet search for “Logic Fallacies in Advertising”. Study one example and share what you learned. Reference the website (URL) that you used/reviewed. As you write-up what you learned, be sure to use some of the terminology that was taught in this unit and/or discuss how you will be a better independent thinker as a result of what you’ve learned in this unit.

## Answer

The first and the most used logical fallacy in advertisement is known as the gross generalization fallacy. It means to suggest that the small sample of observations can be shown to suggest that the same conclusion will be applicable to the larger sample. Another one that is popularly used to lure customers is known as the appeal to authority. It suggests that since a particular actor is advertising a product, therefore, I will buy it (*10 Logical Fallacies in Advertisements – Homan Kaur*, n.d.). A number of other fallacies are also used in advertising as the main purpose is persuasion due to which logic takes the back seat.

**Works Cited:**

*10 Logical Fallacies in Advertisements – Homan Kaur*. (n.d.). Retrieved January 16, 2020, from https://make.sailacademy.ca/hkaur/2017/10/27/10-logical-fallacies-in-advertisements/

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